Journal of the Royal Society of Arts

NO. 5013 FRIDAY, 27TH SEPTEMBER, 1957 VOL. CV

VISIT OF H.R.H. THE PRESIDENT

His Royal Highness The President will preside at a special meeting of the Society to be held at the Society's House at 2.30 p.m. on Thursday, 7th November, when he will present to the Society a new lecture bench, designed by Professor R. D. Russell, R.D.I., which is now being installed in the Lecture Hall. After Sir Alfred Bossom, Chairman of the Council, has accepted this generous presidential gift on behalf of the Society, His Royal Highness will present the R.D.I. Diploma to Mr. Misha Black and the Bicentenary Medal for 1957 to Sir Ernest Goodale. The proceedings will conclude with an Address by Professor Russell, as Master of the Faculty of Royal Designers for Industry.

In view of the exceptional interest of this occasion, admission will be by ticket only. Tickets will be issued up to the available accommodation in the order of the receipt of applications. In the first instance only one ticket will be allotted to each Fellow applying, but if on 31st October it appears possible to issue some second tickets, these will be allotted up to capacity, again in the order of application, to those Fellows who have asked for them. In view of the inevitable delay before their applications can be received, special consideration will be given to Fellows applying from overseas.

FURTHER CONFERENCE ON PERILS AND PROSPECTS IN TOWN AND COUNTRY

The Council of the Society has decided, on the advice of a small Committee under the Chairmanship of Sir Stephen Tallents, to arrange a further one-day Conference at the Society's House, on Thursday, 21st November, 1957.

This will be a sequel to the Conference held in October last year, and it is designed to draw attention to two particular subjects, namely the reclamation of land disfigured by industrial uses and the skilful enlargement of villages. Mr. Duncan Sandys, who opened the Conference last year, has agreed to open this Conference, and among the speakers expected are Sir William Holford, Mr. S. A. Sadler Forster, Mr. U. Aylmer Coates, the Honble. Lionel Brett and Mr. Thomas Sharp. It is hoped that as many as possible of the large number of organizations and persons who have practical knowledge of the subjects to be discussed will be represented, as it is intended to allow ample time for delegates to contribute their own experience and opinions.

A limited number of places will also be reserved for Fellows of the Society, and those who wish to attend should apply to the Deputy Secretary not later than 31st October.

SCIENCE IN ARCHAEOLOGY

The Trueman Wood Lecture by

SIR MORTIMER WHEELER, C.I.E., M.C., D.Litt., F.B.A.,

President of the Society of Antiquaries, delivered to the Society on Wednesday, 15th May, 1957, with R. W. Holland, O.B.E., M.A., M.Sc., LL.D., Chairman of Council of the Society, in the Chair

THE CHAIRMAN: One of the privileges of the Chairman of Council of the Royal Society of Arts is to take the Chair at the Trueman Wood Lecture. On this occasion, it is not only a privilege but much more, in view of the eminence of the lecturer. Most people on occasions of this kind, when they are about to introduce someone who really needs no introduction, fly to *Who's Who*. I did so, and it left me feeling like the old Victorian comedian of my youth, who was taking the part of the wicked uncle in the *Babes in the Wood*: he entered the castle and found the two babes reading a book, and he said, 'My dears, what are you doing?' and the boy replied, 'We are studying the Queen's dominions'; and the comedian's reply was, 'Close the book, she owns the earth'. So, having looked in *Who's Who*, I close the book—he owns the earth. It was impossible for me to pick out a few from the many highlights, and say, 'This is Sir Mortimer Wheeler, and he is so and so and so and so'. I am left to my own devices, and to say that I have never had greater pleasure than introducing to you one who has made archæology a household word, and one whom all of you—or, at any rate, the moderns amongst you—will know.

The following lecture was then delivered:

THE LECTURE

During the past fifty years, and not least during the last ten of them, science has made remarkable contributions to the study of the human achievement: so much so that we have been compelled to accustom ourselves to a recurrent readjustment of primary values, to a fluidity of computation which is constantly washing away or reshaping familiar landmarks. No doubt the purging and fertilizing process will continue. Paradoxically perhaps, an increasingly scientific precision may be expected to induce an increasingly agnostic judgement, less because our main facts are wrong than because their accumulation constantly enlarges the complexity of reality.

Let me begin by recalling to you in briefest summary certain of the more resounding impacts of objective science upon archæological studies during the period which I have named. In the early years of the present century two methods, now very familiar, of dating the past were evolved or stated, respectively in America and in Sweden. The former, with which the name of Dr. A. E. Douglass is primarily associated, was based upon the annual growth-rings exhibited by the sections of trees which have grown in a climate marked by regular seasonal changes. These growth rings are often distinct enough for accurate measurement.

They vary individually and group themselves into cycles, seemingly under the control of solar radiation; so that in the long lived 'big trees' of California it has been possible to establish a coherent tree-ring pattern, a tree-ring time-table, for the past 3,000 years. With this pattern, under suitable conditions, timbers used in prehistoric (that is, pre-Columbian) American buildings have been equated, and the equation is susceptible to a sufficient accuracy to provide exact dates for these buildings, or at least for their timbering, as far back as the first millennium of the present era, eight or nine centuries before the *conquistadors* brought history to that continent. Attempts to extend the method outside the south-western States of America have so far been less satisfactory, but the boon to certain phases of American prehistory has been incalculable.

In Sweden a not altogether incomparable method was evolved by geologists under the leadership of Baron Gerard de Geer, who long ago recognized in the varved or banded clays of that country the annual deposits on the fringe of the ice-field during the summer melting. At one time the ice-field completely enveloped Sweden and so barred completely the advent of animal life, including man. As the ice-field slowly retreated northwards in an ameliorating climate, the range of the annual deposits retreated with it, forming a receding succession which has been likened to that of the slates on a roof, and leaving an increasing expanse of southern Sweden open to animal and human settlement. The clay-bands vary in thickness and kind, and are, with controls and reservations, identifiable in successive sections from place to place; so that, by counting them, observers have been able to work out a time-table, approximating to a calendar, for the progressive release of the underlying land-surface in different parts of Sweden. The resultant calculation that 6,839 years have elapsed since the first moment of liberation (and the first potential arrival of man) has been widely accepted without serious modification and, with partially conjectural extension, has set a term to the extravagant guesses which formerly prevailed as to the possible antiquity of human life in northern Europe.

These contributions of botany and geology to the human time-table may be followed by another contribution from botany. The melting of the Scandinavian ice-field to which I have just referred had two opposite results which unequally compensated each other. First, the release of immense quantities of water from the dissolving ice raised the level of the sea, and in particular of the Baltic. Secondly, the incidental lightening of the load upon the earth's crust tended to result in an upsurgence of the Scandinavian land-surface, thus varying the shape of the Baltic and the adjacent lands, and in the process lowering or raising sea beaches, some of which, now high and dry, are to-day available to investigation. These vacillations may in turn be associated with de Geer's varved or banded clay system on the one hand and with peat deposits on the other; and the peat has the fortunate property of preserving organic remains, of which the most generally important are plants and their seeds. A study of these seeds, pollen-analysis, enables us to reconstruct the vegetation which they represent, and so to infer their climatic environment. The three factors in combination—banded clays, shore-lines and tree-growth—provide a succession of episodes

which can be roughly related to one another in time and can be associated with phases of human culture. The appropriate techniques were developed in Scandinavia between the wars and, in this country, owe much to the enterprise of the University of Cambridge, with Dr. H. Godwin on the botanical side and Professor Grahame Clark on the archæological. Pollen-analysis is now a standard archæological technique wherever suitable evidence is recoverable.

But the succession of climates and their relation to a time-scale are not an exclusive prerogative of the geologists and the botanists. Were I a mathematician and an astronomer (and I am neither), I would attempt to tell you of the elaborate fashion in which the calculable variations in the amount of radiation received by the earth from the sun have been related to the climatic variations of the glacial periods, during which man first appeared upon the European scene. Two centuries of work have culminated during the past forty years in a correlation which has produced a provisionally acceptable absolute chronology for the successive glaciations; and thus for the remoter periods of man's life on earth our astronomical calendar is a substantive document.

Three other scientific techniques, all of them new to practice within the last ten years, will suffice for further illustration. The first of these is the 'fluorine' test which lately produced such dramatic results in its application to the Piltdown bones. Fluorine is an element which may be contained by the moisture of a gravel bed, and gradually penetrates bones buried in that bed. The degree of absorption varies with age and the amount of fluorine present; it is in all circumstances very slow, but is sufficient to differentiate bones buried at long intervals of time in the same gravel-deposit. It is thus a *relative* time-test, not an absolute one. In the notorious Piltdown case, the jaw-bone, when tested, was found to contain a comparatively negligible amount of fluorine and was eventually proved on that and other grounds to be a modern fake. Another fluorine test, where fraudulence was not an issue, was that of a much-discussed human skeleton found at Galley Hill, Swanscombe, in Kent, allegedly in a pleistocene or palæolithic deposit in 1888. The skeleton is of relatively modern type and, if really something like 100,000 years old, would be an unparalleled example of the antiquity of *Homo sapiens*. The insignificant fluorine content, compared with that of mineralized bones from the same deposit, has proved the relative modernity of the skeleton and has thus removed an awkward limb from our family tree.

A counterpart to the fluorine test is the nitrogen test. In a sense, this works in the opposite direction. Whereas fluorine is slowly absorbed by buried bones, the nitrogen contained originally in their protein is gradually lost with the passing of time. Bones preserved under approximately similar conditions may be expected to lose their nitrogen at approximately the same rate, and the test is again useful therefore in establishing the contemporaneity (or otherwise) of associated bones. The amount of nitrogen retained by the spurious Piltdown jaw was that of a modern bone, and greatly exceeded the nitrogen content of the Pleistocene bones said to have been associated with it. Thus the deficiency of fluorine on the one hand and the abundance of nitrogen on the other were

facets of the same intriguing story of detection whereby the jaw has now been relegated to the Newgate Calendar.

Last of my examples is the crowning glory of science in this humanistic context. It is the famous radio-carbon test which came to us from Chicago as a by-product of atomic research in 1949 and has already given a new definition to much hazy thinking. The theoretical principle of this test is simple enough. Under the influence of cosmic rays from the outer space, radio-active carbon atoms of atomic weight 14—whence they are known as Carbon 14 or C 14—are formed in the atmosphere, and are there associated with ordinary carbon atoms of atomic weight 12—Carbon 12 or C 12. Furthermore—and this is the important factor—between the two groups of atoms, C 14 and C 12, a fixed ratio is maintained in the carbon dioxide of the atmosphere. Now the carbon dioxide containing this fixed ratio is absorbed by plants, and, since plants enter directly or indirectly into the substance of all organic nature, all living things (whether animals, shell-fish, or plain you and me) incorporate C 14 and C 12 in this known and constant mutual proportion. *But*, from the moment of death the organic subject begins to lose C 14, and the proportion of C 14 to C 12 thereafter decreases in it *at a known rate*. Your boots, for example, have proportionately less C 14 than your body. Now, within limits, the surviving amount of C 14 is measurable, so that, since as I say the rate of decrease is known, the length of time since death can be calculated within a present maximum of just over 40,000 years. There are, as might be expected, pitfalls in this process, and from start to finish the test is subject to many controls and some reservations. But by and large it is now accepted, and its reliability will increase with experience and mechanical improvement. The number of machines and available operatives is still tiny in relation to the potentiality of the test; in this country, there are as yet only two or three machines, of which I believe that not more than one is at the present moment in working order, and that intermittently.

A few random examples will serve to illustrate the sort of achievement which may be expected from this test. In North America the last advance of the Wisconsin glaciation passed over tree-trunks, the average age of which by the Carbon 14 method is about 11,400 years from the present day, less than half the age formerly expected by geologists. The oldest artifacts determined in America are, or were recently, some rope sandals covered by volcanic deposits in Oregon; the age indicated by the test was about 7,000 B.C., a very unimpressive record for the Western Hemisphere, but subject, I have no doubt, to supercession in due course. Nearer home, wood from a mesolithic settlement skilfully excavated a few years ago by Professor Grahame Clark at Star Carr, near Scarborough, yielded a date of about 7,400 B.C., which is now one of the few fixed time-points in pre-neolithic Britain. In the Near East, two dates of high importance to any study of Man's achievement have been obtained by the test: a village of primitive farmers in the Khurdish hills was thus dated, on the basis of charcoal and land-mollusca, to about 4,700 B.C.; and more recently at Jericho in Jordan the earlier towns of that very remarkable site have been

provisionally attributed to a date in the vicinity of 7,000 B.C. The Jericho material is still under examination; I shall have occasion to refer to it again in a few minutes.

There my selected list of scientific techniques must cease, though it could readily be enlarged. It will suffice to indicate their main trend: namely, to provide new means of establishing a calendar of human achievement beyond the narrow bounds of reliable written record. The importance of this objective deserves emphasis.

The earliest writing known to us is that borne by clay tablets inscribed in Mesopotamia somewhat before 3,000 B.C. The tablets at first preserved little more than wage-lists and inventories, which command our gratitude but in no sense rank as 'history'. After 3,000 B.C. they began gradually to assume something of an historical value, and the parallel civilization of Egypt, having evolved a script of its own, extended the range of rudimentary record. By stretching the phrase to breaking-point we may say that 'written history' began something under 5,000 years ago in the lands of the Twin Rivers and the Nile. And if we set against that the accepted antiquity of Man, in the neighbourhood of 600,000 years, it is easy to calculate that his unwritten record is well over a hundred times as long as his written record. Moreover, since there is evidence of early Man in all three continents of the Old World—though not in the New, which seems to have been colonized from the Soviet Union at a fairly recent date—the geographical no less than the temporal inadequacy of the early written record is manifest. The helping hand of science in the provision of dates long before the first written calendars is proportionately welcome.

Now this matter of dates and ages is no mere matter of pedantic curiosity. It is vital to our understanding of the human past. Admittedly, it can on occasion be overdone; I recall years ago in a scholarly publication coming, with a measure of irreverent cynicism, across a lengthy and learned article on the question, 'Was Julius Cæsar born in 101 or 102 B.C.?' I regret that I have forgotten the answer. But by and large, an accurate chronology in human affairs is of the utmost importance. It is all rather like focusing a camera; in a lens out of focus, our subject is blurred and the inter-relationship of its parts insignificant. Equally, without a controlling time-table, we cannot project our understanding clearly and intelligently into the past, cannot *focus* it and so comprehend that vital interplay of events, habits and ideas which gives the past its meaning. True, chronology is not archæology, any more than a time-table is a train. But archæology divorced from chronology is as useless as a railway-system without a *Bradshaw*. And the sterling contribution of modern science to our study of the past has been just this: the provision of new means of interrelating the human story over long periods of time in terms of a sound, objective scientific calendar.

Now this new and increasing precision in the matters of time and interrelationship has an important bearing upon certain work which is being done at the present moment by some of my colleagues on problems of high importance to our knowledge of man. To emphasize the general value of those problems, I would first put them into the longest possible perspective. Let me say at once

that they relate, as a group, to one of the three outstanding episodes in the story of human achievement; the three episodes which, in the half-million years or more of human existence, dwarf all others. I refer to the successive discoveries of fire-production, food-production, and power-production.

Of these tremendous discoveries, that of fire has been traced back almost as far as man himself. Perhaps 300,000 to 400,000 years ago primitive human beings sheltered in clefts in the rock at Chou K'ou Tien, near Peking. There, contemporary with the remains of thick, massy-browed, large-toothed skulls which were nevertheless anatomically human, were layers of ashes representing hearths of long duration. By what mechanism these hearths had been kindled, we do not know; but for warmth, light, cooking and, not least, for protection, Peking Man in his caves and shelters already possessed the inestimable blessing of fire.

For the moment I defer the second member of my triad of revolutions in order to remind you that with the third we have an immediate and personal concern. I refer, I need hardly say, to the development of mechanical energy during the past century and a half, successively by the application of steam, electricity, oil, and nuclear power. Of that hurrying and now headlong process, I need say no more. To-day we live under the shadow of a potential which can scarcely be anticipated save in terms of romance or Grand Guignol. But retrospectively it is a remarkable thought that, until early in the nineteenth century, when inventors began first to produce steam-engines on an economic basis, no mechanical advancement of the first order had occurred since the age of Archimedes. If nothing else, we are now making up for lost time.

It is, however, of the second of these three chosen episodes that I would especially speak. Set between the two which I have mentioned, it is beyond question the greatest, as it is certainly the most pacific, of them all. I refer to the first production of food.

I need not spend time in a prolonged discussion of the significance of this event. I will merely ask you to imagine the story of human 'progress' plotted as a mathematical graph. For most of human time—for over half a million years—the plot would be substantially horizontal. Its tiny variations would mostly reflect environmental changes in which, to a slightly greater or less degree, man might exploit favouring opportunity or, on the contrary, yield a little to hardening circumstance. The cave art of the later palæolithic is an example of the former, aspects of the marsh-ridden Mesolithic illustrate the latter. But, in the long view, material advancement was scarcely emphatic enough to alleviate the monotony inevitable to a fragmented society jealously dependent upon the accidents of nature for its sustenance. Millennium after millennium, the limits of advancement were defined by a non-productive economy and by a consequent dispersal of the population and a proportionate lack of social opportunity for the development and transmission of ideas or experience.

And then, with startling suddenness as it now seems to us, the direction of the plot changes. Quite near its end, the graph-line bends sharply upwards in a steepening ascent, like the climb of a jet-fighter. From parasite, man had turned producer. With milk and meat at his doors, wheat and barley in his fields, his

community had swollen from the family to the village, even to the town, with regulated routine, widening interchange, and accumulating skills. The path to civilization had been mapped. Food-production: no other event in the human story is of commensurate importance with that complex discovery.

I have mentioned widening interchange amongst the benefits which attended this development of food-production. That is really the crux of the whole matter. True, some sort of interchange had already begun with the formulation of intelligibly variable sounds, with speech, long ages before the first crop was sown. But it was the enlargement of the social unit by an artificially enlarged and guaranteed food-supply that first provided listeners and contributors on a significant scale, with powers of extended intellectual co-operation and a proportionately increasing tempo of cultural development. If I were asked to name the (necessarily artificial) point at which human 'progress' ceased to be primarily biological and first became primarily cultural or 'psycho-social', I should name the moment when man, by taming herd-animals and cultivating edible grasses, was first enabled and indeed compelled to seek out his fellow men, and was no longer driven merely to shun them as so many rival mouths. In all this technical and social advance, the one thing that matters above all others is the inherent and revolutionary enlargement of the reach of ideas which accompanied it and was destined, after no great lapse of centuries, to culminate in a world linked by instantaneous transmission.

For a few minutes I propose to dwell upon the beginning of this revolutionary episode because it was a phenomenon which, without the guidance of scientific techniques, would remain very largely beyond the scope of rational reconstruction. Even with them our knowledge can never match the complexity of the problem; but there are signs that, with the aid above all of a radio-carbon chronology, we shall now begin to approach more nearly to an understanding of the circumstances in which, after 500 millennia of servitude, a new sense of mastery first entered into the human spirit. Before that understanding can take tangible shape, much further archæological work must be accomplished in the field. But some part of the necessary work is already in active progress.

Let us glance first at the geographical aspect of the matter. Logic compels us to suppose that the cultivation of food—farming—began in a region where the domesticated animals and plants essential to the farmer flourish or formerly flourished in a wild state. South-east Asia, which has been postulated as a source, is ruled out because, although it has produced certain edible plants—bananas, yams, rice—and certain livestock—pigs, fowls, perhaps dogs—it is devoid of the all-important grains and herd-animals. For these we have to look further west; and, without more ado, it is agreed that western Asia, between the Mediterranean and the Indus Valley of West Pakistan, is the focus of our search.

But when and how? One thing is certain: already centuries before history began, before 3,000 B.C., village life had developed on the Iranian plateau and up to the foot-hills of the Caucasus to an extent which implied stock-farming and, to a greater or less extent, agriculture. When, however, we turn from this generality to the details upon which our understanding must be based, we enter

a phase of research which can at present be described as a scientific competition rather than an orderly aggregation of facts. The radio-carbon test is still too new to enable us to arrange a sufficiency of material in its time-relationship and so to distinguish the main currents from the pools and backwaters.

For example, Dr. Carleton Coon of Philadelphia, with great enterprise and determination, has been exploring caves by the fertile and forested shores of the Caspian. Two of these caves, which he calls the 'Belt' cave and the 'Hotu' cave, have produced a succession of Stone Age and later cultures, for some of which radio-carbon dates have been supplied. These carry the earlier Neolithic phase there back to something approaching 6,000 B.C., and the cave-dwellers of that age, though they had not yet acquired the art of making pots and pans, seem to have had flocks of domesticated sheep and goats. Whether they also cleared and cultivated patches of the adjacent forest-land is less certain; but Dr. Coon would like to see in them the forerunners of the earliest herdsmen and tillers of Europe, and so would give them a privileged position in the prehistory of our own continent.

> Many writers have claimed [he writes] that Europeans had derived their Neolithic culture from the arid lands of Palestine, Syria, and Iraq, from the so-called Fertile Crescent of arable land surrounding the eastern, western and northern flanks of the Arabian desert. I had always found it hard to believe this because the European Neolithic was a forest culture in which wood-working played a prominent part, and in which agriculture was carried on in small patches of soil cleared by axe and fire, rather than on semi-arid open plains.[1]

So my friend Dr. Carleton Coon. Let us leave him planting the flag of ancestral food-production on the pleasant shores of the Caspian, and turn to those more southerly and arid lands which he rejects.

There I have already referred to two crucial sites. One of them, Jarmo by name, lies in the Khurdish hills east of the upper Tigris, and was excavated by Dr. Robert Braidwood of Chicago before and after 1950. At the bottom of a mound upwards of 20 feet high and 3 acres in area, Braidwood found a village of peasants who had cultivated wheat and barley at a date determined by repeated radio-carbon tests as plus-minus 4,700 B.C. Like the early Caspians, these villagers had at the time no pottery but lived otherwise in a reputable Stone Age fashion. For several years after their discovery, they held a cultural position of uncommon distinction; for they were the most ancient folk in the world to whom, on clear and undisputed evidence, a knowledge of agriculture could be ascribed. Others abode our question, they at least were free.

But not for long. Last year, at Jericho in the Jordan valley, Dr. Kathleen Kenyon scattered Khurds and Caspians alike in the struggle towards a fuller truth. Beside the spring which, age after age, has poured something like a thousand gallons of precious drinking-water a minute on to the forbidding soil of this sombre landscape, peoples of many nations have lived and fed their

[1] Carleton S. Coon, *Seven Caves* (London, 1957), p. 135.

flocks and fields. To-day, on the strength of it, the little town of Jericho has, as unwilling guests, two immense encampments of Arab refugees upon its doorstep. For thousands of years before the advent of Joshua and his trumpets, men lived here and jealously preserved their livelihood by means of fortifications which enclosed or overshadowed their fountain.

In the March of last year, when I visited the site, Dr. Kenyon had just completed her first great trench down through this piled accumulation of towns, built one upon the other until no fewer than 24 of them lay beneath the city of the Israelites. And the earliest town of them all had already much of that quality which was later, in the mighty valleys of western Asia, to flower into evolved and complex civilizations. It had a civic administration employing a labour-force which could surround it with a laboriously rock-cut ditch and a high stone wall, armed with towers and sheltering close-built houses. Its food-supply was as surely guaranteed by its farmers as was its water-supply by nature. If it still lacked the craft of the potter and the art of the scribe, it made do adequately with stone, wood, and basketry, and with the unblemished memory which in India could carry the Rig-Veda unwritten through the ages or in Greece sustain the traditional epics before Homer. As the oldest known town in the world, the first Jericho has at present a unique prestige in the wider epic of mankind.

But how old *is* Jericho? How are we to relate its evolved urbanity with those other evidences which I have cited, and with others doubtless yet to come? A mere ten years ago we should have been at a loss. To-day, perhaps at the present moment, science is at work upon the problem, and will in proper course supply the answer. Professor F. E. Zeuner and the Royal Institution of Great Britain are in process of calculating the radio-carbon content of the relevant material. Their final answers are not yet ready for publication, and I will only say this: I shall not be at all surprised to learn that the town of Jericho was a going concern as much as 9,000 years ago. If that is indeed the measure of Professor Zeuner's answer, we shall have to sit back and think. It will mean a re-sorting of values in many matters and directions relating to human progress. Above all, it will mark the beginning of much fresh exploratory work. And at the back of our thoughts must abide the reflection, how much of this new world is owed to the intervention and control of objective science.

I have been dealing with the accumulation of new facts relating to that wayward creature, Man, and have emphasized the increasingly important share which physical, chemical, botanical, geological and even astronomical science is assuming in this fact-finding business. But I am not pretending that the study of man's material past, otherwise archæology, is on that account a science. I have just described Man as a wayward animal, and in so far as he is unpredictable he escapes the reach of science. Admittedly, a late-nineteenth-century scientist proclaimed that

> all matter, including the matter of the brain, which is the physical seat of our emotions and reasoning, is made up of material atoms: the behaviour of all atoms is governed by precise mechanical laws . . . and our thoughts, arising

> as a result of material combinations and changes in the brain, ultimately depend upon mechanical laws.[1]

But this crude materialism certainly approaches far less nearly to essential truth than does the traditional and even mythological dichotomy between mind and matter, soul and body. It turns mankind into a tram, whereas in fact he is at least a bus. And more modern scientists have fairly faced this fact. Dr. Andrade reminds us that Sherrington, the greatest physiologist of his time,

> the man who investigated with surpassing skill and interpretative genius the mechanism of bodily action, concluded his great book [*Man on his Nature*] with the words, 'We have, because human, an inalienable prerogative of responsibility, which we cannot devolve, no, not as once was thought, even upon the stars. We can share it only with each other.' I quote Sherrington [adds Andrade], because he was not professedly a religious man and so had nothing but the scriptures of science to inspire him against materialism.[2]

At the most, then, science will help us archæologists to set the scene in time and place. In the Toynbean vocabulary, it can help us to define the material Challenge. For the mental processes which have variously conditioned the Response we are thrown back upon factors that are ultimately independent of most of the evidence available to the scientist. At that point the archæologist, if he is to be a little more than a descriptive fact-finder, must seek refuge in predication or philosophy; he is no longer a scientist in any accepted sense. But if I end upon a note of doubt and even frustration, I am consoled to find that the scientists themselves are nowadays less sure of their values than we sometimes imagine them to be. I see that Dr. Andrade, from whose survey of modern physics I quoted just now, calls his last chapter 'Uncertainty'. I too cannot do better than repeat in conclusion the paradox with which I began: that increasing knowledge magnifies the stature of our doubt.

DISCUSSION

PROFESSOR H. J. PLENDERLEITH, M.C.: It may be claimed that Sir Mortimer Wheeler, more than anyone else, has brought archæology to the fireside. He has the great gift of being able to make the complex sound simple; and we have had a very good example of this facility of thought and exposition in his lecture to-day.

In modern times it is more than ever essential for the archæologist to interest himself in subjects relating to his speciality and of these, surely, scientific studies of one kind or another are among the most important and rewarding. Sir Mortimer's interests are all-embracing, and to-day he has chosen to describe, among other things, certain laboratory methods that have opened up a whole new sector of interest in the study of antiquity, namely, that relating to methods of age determination. Of greatest interest at the present time is the method of dating antiquities by estimating their radio-carbon content, and this work, as has been mentioned, is being carried out in several laboratories in this country including that of the British Museum.

Now, it is not my intention to attempt to add anything factual to what has already been so adequately treated, but a comment from the laboratory point of view may not be without interest.

[1] E. N. da C. Andrade, *An Approach to Modern Physics* (London, 1956), p. 218, citing Ernst Mach.

[2] Ibid., p. 221.

It is an inescapable fact that radio-carbon dates cannot be absolutely precise. There is an element of error involved in the measurement of radio-activity, and this, together with other variables which enter into the basic assumptions of the method, leads to the all-important 'error-terms' associated with the published dates. The accuracy obtainable varies from laboratory to laboratory depending on the methods used and the refinement of the apparatus. The cost and complexity of the instrumentation alone is a major handicap to most of us in this country, and to this one must add the need for scientists with a wide range of qualifications in order to operate and maintain the chemical and electronic equipment.

The handicaps are formidable, but overshadowing all is the complication now introduced by radio-active fall-out from atomic bomb tests. This is adding considerably and increasingly to the difficulties of this specialized field of measurements. The original Libby method, for example, is now completely unworkable because of interference from fall-out, and even the modern gas-counting techniques such as we have been developing at the British Museum are not completely immune, although designed so that all operations are conducted in a system sealed from the atmosphere. Indeed, a low background counting system is becoming increasingly difficult to achieve partly on account of fall-out, and partly because of the widespread occurrence of radio-activity in materials of construction—we have had to scrap no fewer than three counters because the steel of which they were composed was found to be slightly contaminated with radio-active material! Other laboratories have suffered similarly. We feel very much that we are working against time. There is, of course, a purely scientific aspect of this work—research might be directed towards producing methods that are uninfluenced by these factors. But we are concerned to-day with the archæological implications. Archæologists are pressing for results, and we who are anxious to supply these results are doing our best with existing facilities while appealing to those who realize the significance of the time factor in radio-carbon dating to use such influence as they may have to further these researches by augmenting our limited resources before it is too late.

I have much enjoyed this lecture and join with you in congratulating Sir Mortimer Wheeler.

MR. D. J. AVERY: Sir Mortimer did mention a date, 4700. Would he give me some idea of what the plus and minus difference is?

THE LECTURER: The plus or minus given by Dr. Libby of Chicago in connection with those dates which I have averaged 4700 was approximately 250 years on either side.

THE CHAIRMAN: My duty now is a further pleasure: to thank Sir Mortimer Wheeler for the very interesting paper that he has given to us. Did you notice that he was a lecturer until a quarter to three, and after that he became the teacher, and until he finished he was distinctly the teacher, and I, as one who dabbles in quite a lot of things, am grateful to him for what he has told us. We also ought to be grateful to Professor Plenderleith for his contribution, but in Sir Mortimer's defence I would say that the Carbon 14 test is accepted 'with reservations'. The reservations have now been given to you, so I hope that you will go away happy and that you will offer your grateful thanks in the usual way to Sir Mortimer Wheeler.

The vote of thanks was carried with acclamation, and the meeting then ended.

THE IMPERIAL INSTITUTE

The Thomas Holland Memorial Lecture by

KENNETH BRADLEY, C.M.G.,

Director of the Imperial Institute, delivered to the Commonwealth Section of the Society on Tuesday, 28th May, 1957, with Sir Gilbert Rennie, G.B.E., K.C.M.G., M.C., High Commissioner for the Federation of Rhodesia and Nyasaland, in the Chair

THE CHAIRMAN: It is hardly necessary for me to introduce Mr. Bradley to this audience, but for the sake of the record I should perhaps say that he joined the Colonial Administrative Service in Northern Rhodesia in 1926 and served in a variety of posts in the provincial administration until 1939. He then became the Information Officer for three years. He was probably the first Information Officer in the Colonial Service, and I think the first to introduce special broadcasting for Africans. I myself was in Kenya at that time and Mr. Bradley's reputation as an Information Officer reached me in Kenya, where I heard of the splendid work which he was doing in Northern Rhodesia. After leaving Northern Rhodesia in 1942 he went on to the Falkland Islands as Colonial and Financial Secretary. From there he went to the Gold Coast in 1946 in the capacity of Under-Secretary. He acted as Colonial Secretary for various periods in 1946 and 1947, and was Chairman of the Committee that led to the establishment of the University College. He retired after his work in the Gold Coast and became the founder-editor of the magazine *Corona*, which from the very first number proved to be a very attractive and popular publication.

He left *Corona* in 1953 and became Director of the Imperial Institute. Some may wonder why after such a career Mr. Bradley should have become Director of the Imperial Institute, which these days is so largely an educational institute; but I am told on good authority that his grandfather was George Bradley, who was a master at Rugby under Arnold and thereafter Headmaster of Marlborough, Master of University College, Oxford, and Dean of Westminster. In addition, Mr. Bradley had two great-uncles who were Professors at Oxford, and of his three brothers and himself —although they all went into either the Indian Civil Service or the Colonial Service—three are now back in the educational world. So Mr. Bradley in his present post is really carrying on the educational training and tradition of his family.

Mr. Bradley is also the author of quite a number of books. His first, *Africa Notwithstanding*, was published in 1928. Then came *The Diary of a District Officer* in 1939, *The Colonial Service as a Career* in 1950, *Copper Venture* in 1952, *Britain's Purpose in Africa* in 1955, and *Pattern of Freedom* in 1956. In Mr. Bradley we have a lecturer who is in many ways in a category of his own. I have much pleasure in calling upon him to speak.

The lecture, which was illustrated by lantern slides, was then delivered:

THE LECTURE

I should like to begin by saying how very much I appreciate the privilege of being invited to give this Thomas Holland Memorial Lecture, and by

expressing to you the gratitude of my Board of Governors for the honour which this choice of subject has conferred upon the Imperial Institute.

The invitation was also timely because this lecture is being delivered at a turning point in the history of the Institute. Within the next year or so the great familiar building in South Kensington will begin to disappear and, while its demolition is still going on, a new Institute will be rising in another place.

The present building is a memorial to the Golden Jubilee of Queen Victoria. The idea that such a memorial should take the form of an Imperial Institute came from the Prince of Wales, afterwards King Edward VII. It was he who, in 1886, set up a Committee under Lord Herschell, then Lord Chancellor, to collect the necessary funds and put up the building, and he afterwards became our first President. The money for the Institute was collected partly through a Mansion House fund opened by Sir John Staples, the Lord Mayor, and partly by Lord Herschell's Committee. The Prince said:

> In order to afford to the Queen the fullest satisfaction, the proposed Memorial should not be merely personal in its character, but should tend to serve the interests of the entire Empire, and to promote a feeling of unity among the whole of Her Majesty's subjects.

This sentiment appealed strongly to the public, both here and overseas, and contributions came in from millions of people all over the Empire to a total of £413,000, including a substantial sum collected by this Society. To this were added other large donations from individual sources, notably one of two lacs of rupees from Sir Cowasjee Jehangir, and the final amount subscribed was about £440,000. Of this, £140,000 had to be set aside as an endowment in terms of the Charter, which left £300,000.

The final cost of the whole great building as we know it to-day, including the exhibition galleries, was in fact £355,000, the balance of £55,000 having been raised on a mortgage.

The site chosen for the building was part of the Royal Horticultural Society's Gardens which was leased to the Institute by the Royal Commissioners for the Great Exhibition of 1851 for a term of 999 years.

The architect, chosen by limited competition, was T. E. Collcutt, and his designs for the building were awarded a prize at an architectural exhibition in Paris, which must have been highly gratifying to His Royal Highness and the Organizing Committee. The winds of controversy have recently been raging about Collcutt's towers and pinnacles, but they have, for the moment at any rate, died down, and I certainly have no wish to raise them again this evening. I will content myself with quoting to you a few lines from a description of the building written in 1892:

> The prevailing style of the building is a free rendering of the Renaissance, and as the amplitude of mouldings and the abundance of arabesque carving show a decided relationship to Early Italian Renaissance, it may be said that the Imperial Institute affords a characteristic example of the gradual movement towards the Renaissance, as practised in this country during the last two decades.

We know that our grandfathers admired it. Our own generation would appear to be of a divided mind about it, and I do not think our children like it very much, but I wonder what our grandchildren would have thought of it?

Before I leave the subject of Collcutt's architecture, I would like to tell you a little about The Queen's Tower. It is 287 feet high and its bell-chamber, 200 feet above the ground, is said to be the highest in the Kingdom. It contains the magnificent Alexandra Ring of ten bells, which was a personal gift to the Prince of Wales from an Australian lady, Mrs. Elizabeth Millar of Melbourne. She asked if they could be named after Alexandra, Princess of Wales, and if they could always be rung on Royal anniversaries. They were so named and are still rung on seven days in the year in accordance with her wishes—by the Ancient Society of College Youths. Each bell is named after a member of the Royal Family as it was in 1887. They are called Maud, Victoria, Louise, George, Albert Victor, Arthur, Alfred, Alexandra, Albert Edward and 'Victoria R.I. 1837–1887'.

Queen Victoria laid the Foundation Stone of the Institute on 4th July, 1887 and Lord Tennyson, who was Poet Laureate, mentioned it, in an ode which he wrote to commemorate the Golden Jubilee, in the following lines:

> Some Imperial Institute,
> Rich in symbol, in ornament,
> Which may speak to the centuries,
> All the centuries after us,
> Of this great Ceremonial,
> And this year of Jubilee.

The Institute was established by Royal Charter in 1888, a Royal Warrant was issued in 1891, and the Governing Body came into existence in the following year.

The first Director of the Institute was Sir Frederick Abel. On 10th May, 1893, the Queen opened the building in great state—and, incidentally, in a heatwave. The records show that 25,000 people were there and that they consumed, amongst other things, 40,000 sandwiches. The illustrated papers were full of pictures of ladies, overcome by the heat, fainting elegantly in Kensington Gardens, often supported by soldiers in pill-box hats.

In her speech the Queen said:

> I recognize this Institute as a fitting symbol of the unity of the Empire, and it would be a matter of profound satisfaction if this association of the many and diverse countries under my rule should be the means of knitting them more closely together. The Imperial Institute is intended to promote this great purpose, and I now declare it open, with an earnest prayer that it may never cease to flourish as a lasting emblem of the unity and loyalty of my Empire.

Then Her Majesty, by turning a golden key, completed an electric circuit which gave the signal for the first peal of fifty changes from the Alexandra Ring. For this occasion a Mr. Lewis Morris composed an ode. I will spare you all of it except the last verse:

Peal joy-bells unawakened yet, nor cease!
Peal till our isles and continents rejoice!
Fling far and wide a new harmonious Voice!
While through long ages yet, our realms increase
In Unity and Peace.

On the whole, I think, the Imperial hopes of both Queen and poet are being fulfilled, even if not in exactly the way that either of them could have imagined or, perhaps, approved.

There followed seven, but alas only seven, splendid years. The records of them are scanty but there are still pictures in existence to show that brilliant receptions were held at the new Institute with His Royal Highness as host, and in the courtyards behind there are still vestiges of gardens and, until recently, of a fountain. A start was also made with the immense task of filling the galleries with exhibits to illustrate the Empire and its products.

But, alas, by 1899 all the money had gone. The only settled income came from the Endowment Fund and this £4,000 a year was completely swallowed up by a sudden rise in the rates. The repayments on the £55,000 mortgage could not be met and disaster loomed. The Government came to the rescue. It paid off the mortgage and took over the building and its lease. The entrance hall and eastern wing of the Collcutt building, and the Great Hall, which was, and still is, the temporary structure put up for the opening ceremony, were handed over to London University. Virtually only the western wing of the Collcutt building and the exhibition galleries were left to the Institute. The Ministry of Works sub-let to us this part of the building for the balance of 987 years remaining on the original lease.

On the accession of King Edward VII in 1901 the Duke of York (afterwards King George V) accepted the Presidency, but this lapsed in the following year when the Imperial Institute Act was passed. This Act vested control of the Institute in the Board of Trade and extinguished the Royal Charter granted only 14 years before.

I have dwelt at some length on the birth and infancy of the Institute, partly because it is an interesting and not unromantic story, but chiefly because it is particularly important at this time, when the future of the Institute is being planned, to remind ourselves exactly why and how it was founded. My chief purpose, however, this evening is not to give you a long historical survey but rather to tell you something of the work which we are now doing, and of our hopes for the future. If, therefore, I pass over the half-century between 1902 and 1952 rather quickly, I hope I shall not be thought in any way to underestimate the work and achievements of those years.

As a result of the virtual bankruptcy of 1899, the Institute was left as an unwanted baby on the doorstep of the Government, and for fifty years its foster parents did not really know what to do with it. In 1907 control passed from the Board of Trade to the Colonial Office; in 1925 from the Colonial Office to the Department of Overseas Trade, and in 1949 from there to the Ministry of Education. Throughout all this long period the Institute was kept on starvation

rations and all my predecessors had to work under very disheartening conditions. The wonder is that they achieved so much.

During these fifty years the work of the Institute developed on two quite separate lines. Under the Directorship of Professor Sir Wyndham Dunstan, between 1903 and 1923, the foundations were laid of the scientific work for which the Institute became so justly renowned. At the same time, the exhibition galleries were being developed for the two ill-matched purposes of education and the fostering of Empire trade.

Lieutenant-General Sir William Furse was Director from 1925 to 1934 and he was succeeded by Sir Harry Lindsay, one of our own Vice-Presidents, who retired in 1953. In the years between the wars, the scientific services provided for Dominion and Colonial Governments, and for commercial undertakings overseas achieved a considerable reputation throughout the Commonwealth. An important service was the collection and indexing of technical information which was made available through the medium of the Institute's quarterly bulletin or by means of special reports. At the same time much important original work was done on particular products such as timbers and rubber, tanning materials and insecticides, and in the analysis of samples of animal, vegetable and mineral products, and giving advice on their production and marketing. The publication in 1928 of a handbook called *A Descriptive List of Some Empire Timbers* did much to create an interest among commercial users which has since been of the greatest benefit to the development of the forest industries in the Commonwealth. I doubt if there is a Government in the Commonwealth to-day which would not acknowledge a debt to the Institute for the contribution it has made to the development of its country's resources.

At the end of the Second World War, when the economic development of the Colonies received the great impetus of the funds made available under the Colonial Development and Welfare Acts, the Government of the day decided to take over all that side of the Institute's work and the scientific staff as a going concern. To-day the Plant, Animal and Mineral research organizations of the Colonial Office are all housed in the Institute, as our tenants, and they have grown very greatly in size and importance. Since 1949, however, the Institute itself has been concerned solely with education.

By that time the foundations of its educational work had also been firmly laid. The teaching of school parties in the exhibition galleries, the cinema, the provision of teaching aids, and the organization of lectures in schools all over the country, had been well established. These services are all continuing to-day and I am personally much indebted to Sir Harry Lindsay and his predecessors for the good things which they bequeathed to me.

In 1949 as I have said, the Institute again changed masters and came under the *ægis* of the Minister of Education. Within twelve months the Minister set up a Committee of Enquiry, under Lord Tweedsmuir, to assess the value and the potentiality of the Institute as a vehicle for education and information about the Commonwealth. Its report, published in 1952, made far-reaching recommendations, the burden of which was that the Institute did indeed have very

great potentialities and that the Government should either make adequate funds available for developing them or close the Institute down altogether. That report was not officially adopted or pronounced upon by the Government, but the Minister, Miss Florence Horsburgh, did make one very important decision. She said that she would no longer retain her position as President of the Board of Governors but would, instead, appoint an independent Chairman; and she added that it would be the first duty of that Chairman and of the new Director, about to be appointed on Sir Harry Lindsay's retirement, to consider the Tweedsmuir recommendations. Viscount Hudson accepted the Chairmanship early in 1953 and from then, I think, a new epoch may be said to have started. It is indeed a tragedy that Lord Hudson, who died a few months ago in Rhodesia, could not have lived to see his vision for the Institute realized.

Many of the Tweedsmuir recommendations have been overtaken by events, particularly by the decision to pull down the present building and to erect a new Institute elsewhere, but practically all the development of the Institute's work for which Lord Hudson and the new Board of Governors have been responsible in the past few years has followed closely upon the lines of the Tweedsmuir report. Two members of the Tweedsmuir Committee are, in fact, on the Board. The report has, therefore, been effective.

I want to tell you now something about that development. I will not complicate matters by trying to relate our activities to the various recommendations of the Tweedsmuir report, but I would ask you to remember that we have been following them as closely as we can and that they are reflected in most of our activities.

Under an Order-in-Council of 1953 the Institute has become a self-governing grant-aided body, still under the *ægis* of the Minister of Education. It has seven Trustees to look after the property, of whom four are Ministers of the Crown; and a Board of Governors which includes all the High Commissioners, most of the Colonial Commissioners and representatives of educational and other organizations with Commonwealth interests. At the moment the Board has no substantive Chairman pending the appointment of Lord Hudson's successor. The Vice-Chairman is Sir Griffith Williams, who is a Member of your own Council. Under the Board we have three working Committees: an Executive Committee, a Managing Committee which looks after our finances, and an Education Committee, which is very much larger and looks after our educational work. Mr. Robert Beloe, Chief Education Officer for Surrey, who was a member of the Tweedsmuir Committee, is Chairman of this Committee. There are representatives of the Ministry of Education, the Commonwealth Relations Office, the Colonial Office, and the Treasury on our governing bodies, but they are there only as non-voting Assessors—and extremely helpful they are to us.

We are now, as I have said, an independent body. This means that, subject to the general financial control to which any grant-aided institution is necessarily liable, we do have a free hand to form and carry out policy and generally to manage our own affairs. This, I think, is the most important change which has happened in the history of the Institute since it was taken over by the Government in 1902.

The revenues of the Institute, apart from some £5,000 still received as interest on the original endowment fund, come mainly in the form of annual grants-in-aid given to us, not only by the British Government, but by every single Government in the Commonwealth, including St. Helena. This, of course, is as it should be because the Institute was built by the Commonwealth and serves it; and I, for one, hope that it will always continue to be a cooperative enterprise supported by the whole family. This conception, I think, more than justifies the obvious difficulties of managing an organization which relies on 47 different official sources for its income. In 1952/53 the British Government allowed us £13,000, and all the other Commonwealth Governments just over £8,000 between them. In the current year these figures are respectively £40,000 and about £12,000. In addition, we receive special grants from the Colonial Office and some of the overseas Governments of the Commonwealth for our Lecture Service, and in the past four years we have had over £30,000 in capital grants from some of the overseas Governments for the modernization of their permanent exhibitions in our galleries and for financing temporary exhibitions of various kinds. Some of these very considerable increases in our grants are, of course, due to inflation, but they do show how much more support the Institute is now receiving. Without it we could not have expanded our work.

You will remember that Queen Victoria, when she opened the Institute 64 years ago, said that its purpose should be to knit the countries of the Empire more closely together. This, in modern terms, is still its purpose. Our aim is to provide educational services which will help to promote Commonwealth understanding, and to encourage and supplement Commonwealth studies in schools and colleges. We offer opportunities to the general public of increasing their knowledge of Commonwealth affairs and we try, by all the means at our disposal, to contribute to the strengthening of Commonwealth relations by fostering mutual knowledge and understanding between all the peoples of the Commonwealth. All our present activities are designed to further these three purposes.

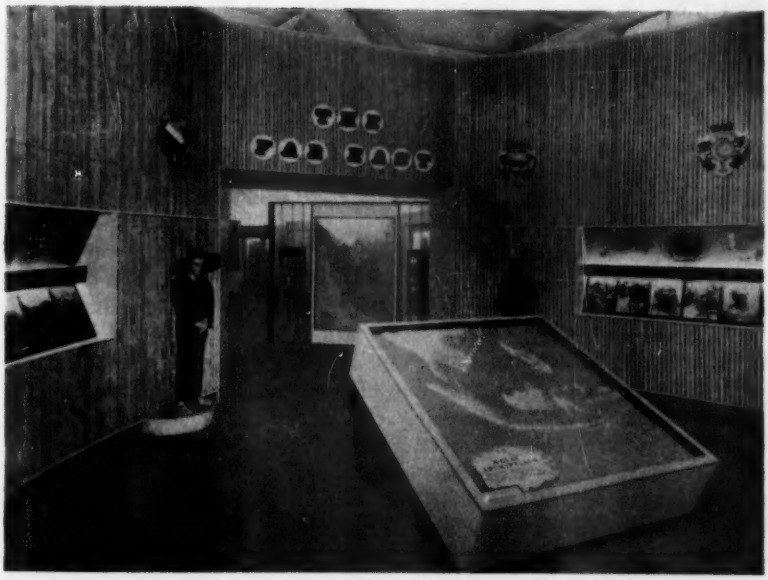
In any enterprise, of course, it is not enough merely to know what you want to do. You must also know why you want to do it, and how you are going to set about it. Lord Hudson, and we who have had the privilege of his leadership at the Institute, have based all that we have been trying to do on the conviction that the Commonwealth of to-day is a great achievement and a splendid experiment, of which all its people, and not least ourselves, can be very proud, and that the Commonwealth of to-morrow can, if vision is fostered and if its unity is cared for and strengthened, be fulfilled as a pattern for world unity and as a triumph of the human spirit. We do not agree with those who say that the Commonwealth is merely an international trading organization with a Board of Directors inspired only by self-interest. Nor do we agree with those who say that the Commonwealth is so tender a plant that if it is touched it may wither away. It is a living and growing organism which needs food and care. We do not, in yet another metaphor, under-estimate the strength of the economic bonds of enlightened self-interest which bind the Commonwealth together, but we do

believe that the less tangible bonds of a common heritage and shared ideals are just as powerful, and that in time to come they may, if they are properly tended, prove to be more enduring. We believe too, that if such a faith as this is to be effective, it must be grounded deeply in knowledge and understanding and that, therefore, our first task is to teach rather than to preach, and to teach, on the basis of that faith, with the complete objectivity which educational integrity demands. In our view, it is of great importance for the future of the Commonwealth that the younger generation, not only in the United Kingdom but in all the other Commonwealth countries as well, should be taught to understand the history and the present structure of the Commonwealth, the shared principles and ideals on which its strength is founded and its great potentialities for the future of the free world. In particular the youth of this country must be taught to appreciate the Colonial responsibilities which they have inherited.

You may perhaps be thinking that, if the Commonwealth were properly taught in the schools, we should not have to supplement that teaching by doing any ourselves. I certainly agree that the history and geography of the Commonwealth should be given much more importance in the curriculum and be taught much more coherently than they are at present. As it is, the Commonwealth only enters into the syllabus incidentally, as it happens to arise in the teaching of general history, regional and continental geography, and current affairs. Very few pupils indeed are encouraged to take Commonwealth History as a subject in the General Certificate Examinations, and fewer still are taught to understand the nature of the Commonwealth and its importance in world affairs, or to be proud of all that we in this country have done and are still doing in the making of it.

To remedy this situation requires a major reform in the educational system which can only, I suppose, come about when a sufficiently widespread demand for it exists in the teaching profession. That is one reason why we do all we can to promote Commonwealth studies in the schools as an integral part of the curriculum, by making our services available to the greatest possible number of teachers and pupils at minimum cost, and in so doing to stimulate such a demand. We can and do help the schools to overcome the basic difficulty of coordinating historical and geographical studies. In our conferences and courses we always do combine them, and that is a thing which a school, bound by its syllabus, finds very hard to do. The demand for Commonwealth studies is growing and, certainly, if the attitude of teachers towards the Commonwealth were not now a great deal more sympathetic than it was before the last war, we should not have been able to double the scale of our work in the past four years.

I have told you, as best I can, what we want to do and why we want to do it, and now I would like to tell you something of how we set about it. The work of the Institute can be divided into two fields: that which is done in the Institute itself and that which is done in the provinces and in Scotland and, though as yet to a very small extent, overseas. There are, at the Institute, about a third



Imperial Institute Exhibition Galleries: entrance to the Far East Court

of a mile of exhibition galleries in which every nation, territory and island in the Commonwealth has its own permanent exhibition. We call them 'Courts'. The most urgent and in some ways the most difficult of all our tasks is the modernization of these 47 separate Courts. It is a long and very expensive process, which is as yet only half complete, so that our galleries to-day remind one of those advertisements showing the patient 'before' and 'after' treatment.

There are two circumstances which make the reconstruction of all these exhibitions particularly important. The first is that education in the schools has now become much more dependent on visual techniques, and that the children, who are mostly television addicts, see things with very sophisticated eyes; and the second is that, in teaching the Commonwealth, we are very largely concerned with human geography, which lends itself admirably to a wider variety of visual teaching methods than any other subject.

In all our designing we re-create each Court as a medium for teaching, in which the complete 'story', in the exhibition sense, of the country concerned is presented as a coherent visual lesson. Each 'story' has the same continuity—geography, history, government, scenery, peoples, products and social services—but every exhibit is different and, throughout, this being human geography, the emphasis is on people. Much of the designing is experimental because, so far as I am aware, no other institution in the world is trying to teach this particular combination of subjects. We use the most up-to-date techniques of museum

display, but we are most definitely not a museum. We are concerned relatively little with the past, but with a whole series of living societies, all different and all rapidly changing. In this year alone, for example, Ghana and the Federation of Malaya will have both achieved independence, and never a month passes without some political or economic development being announced which necessitates the alteration of at least one of our exhibits.

In 1956, 492,000 people came to the Institute. Of these, over 43,000 were schoolchildren who came in parties with their teachers and were taught in classes either by those teachers or by the resident teaching staff of the Institute. These are the visitors we care most about and for whom we plan our Courts. We aim at the 14–15 year-old mental age-group with a little material of a more advanced type to satisfy the needs of sixth-form pupils and undergraduates.

Our teachers do not, of course, merely lecture to the children. That method is out of date. The techniques used vary according to the age of the class and work which they want to do, for most of our lessons are geared directly into the work which the children are doing at school and are, in fact, tailored exactly to their particular needs by previous consultation with their teachers. The children always take an active part in the lesson and whenever possible some form of project work is done, usually by means of 'quizzes' or question papers to which the answers are to be found in the gallery exhibits. We have dozens of these 'quizzes', ranging from economic and social questions for sixth-formers

Imperial Institute, School Reception Centre: a class of secondary-school pupils at the handling table

down to such questions as 'Where does rice grow?' for the 7 year-olds. The actual handling of coconuts, cocoa-beans and other products by the children is also thought to be a most important part of these teaching methods.

We are, of course, delighted to have 450,000 other members of the public at the Institute as well, and that they seem to find the visual teaching aids which we display to them not too far below their intellectual standards. People of all ages patronize our cinema, where the programmes consist entirely of short documentary films about the Commonwealth aimed at about the same mental level; and in the winter evenings we give a series of public lectures.

The Institute is also the centre, in fact it is the only centre, for the distribution of teaching aids about the whole Commonwealth. These vary from study-kits, through film strips, maps and wall-charts, to the whole range of booklets and leaflets covering every aspect of Commonwealth affairs, except textbooks. Some of these aids we make and publish ourselves but we also act as a clearing house for all such material published by official and other reputable sources in the Commonwealth. Last year we sold over 40,000 items (without profit, of course) in this country and overseas. This service, needless to say, is capable of great expansion.

Apart from these strictly educational services, we also put on a continuous series of temporary exhibitions. We seldom have less than two such exhibitions showing at once, and sometimes three. They are of two kinds, being either art exhibitions or those designed to convey information. So far as art is concerned, we believe not only that it is an excellent medium of education, but that it is a potent force for the spread of inter-racial understanding. We are trying to make the Institute the natural 'home' of Commonwealth art in London, and we encourage artists and art societies from all parts of the Commonwealth to send us exhibitions. They are now coming from as far afield as Canada, British Guiana, Africa, Australia and India. At the moment we are showing paintings from Fiji, and a national exhibition of art from Ghana opens, I hope, in July.

The 'information' exhibitions are quite elaborate and usually topical. Last year, when Her Majesty was in West Africa, we made one called 'Nigeria Welcomes The Queen', and this year we are now showing another topical exhibition called 'Antarctic Survey'.

The rest of the work we do in the Institute itself is concerned more directly with Commonwealth relations. We have, for instance, a Commonwealth Students' Club with about 300 members drawn from nearly every part of the Commonwealth. The faith in the Commonwealth which nearly all of them seem to share is very comforting. In addition, the Institute and its cinema are used by all kinds of Commonwealth organizations for social and cultural purposes. Our guests range from the New Zealand Women's Association to Indian and Pakistani cultural societies and a West Indian choir. All this kind of social work may be considered to be outside the immediate purposes for which we are state-subsidized, but it is very much part of our more general aim and we are unrepentant. Indeed, given the premises, we would like to expand it until the Institute became the cultural and social heart of the Commonwealth.

The work which we are doing 'in the field' is on a bigger scale than that at the Institute itself, and perhaps it is more important. It consists, apart from the distribution of teaching aids, which I have already mentioned, of a variety of activities nearly all designed to promote the study of the Commonwealth in the schools. The work in England, Wales and Northern Ireland and the promotion of such studies in the countries of the Commonwealth overseas (a vast field which we have only just begun to enter) are administered from the Institute in London, but Scotland, very properly, administers itself. One of the first things which Lord Hudson did was to establish an autonomous Scottish Committee of the Institute under the Chairmanship of Sir Robert Russell. This Committee is financed largely by the Scottish Education Department and it has its own premises and staff in Edinburgh. It operates within the general policy of the Board of Governors, of which Sir Robert Russell is a member, but it runs its own affairs and has made a good start with developing the work in Scotland.

Numerically, by far the most important extra-mural activity of the Institute is its long-established Lecture Scheme. Last year, lecturers from the Institute gave a total of nearly 6,500 lectures in state-controlled and grant-aided schools all over England, Wales and the Channel Isles to a total of about 650,000 children.

In addition, they gave 350 talks to adult groups, though this side of the work is not being so actively developed as to prejudice that in the schools.

Of greater qualitative importance, perhaps, is the work which we do specifically for the sixth-form pupils of grammar schools and students in teacher training colleges. For the future of the Commonwealth these seem to us to be the most important people of all. Most of this work consists of one-day conferences for anything up to 300 students gathered at central points, usually under the auspices of the Local Education Authorities. At these conferences the whole day is given up to lectures, films and discussion on specific countries or regions of the Commonwealth, or to consideration of certain aspects of Commonwealth affairs, such as British Colonial policy, race relations, or the Colombo Plan. The purpose of these conferences is always to give information on which opinions may be soundly based rather than merely to rouse controversy, and the teaching is always intended to be objective and realistic. This year there will be between thirty-five and forty conferences of this type, including about ten in Scotland.

In addition, we are experimenting with other types of educational projects. Last autumn, for instance, we co-operated with the Sixth-Form Society of North Devon in a whole term's study of Africa. Six grammar schools took part, each school studying one Commonwealth country in Africa, and they all met at the end of term to read papers to a full conference. This was considered to have been a valuable experiment and now we are looking for other sixth-form societies or groups of schools which would like to combine in a similar project. Meanwhile we have been invited by the Headmaster of Rugby to hold a conference and a week's course there on Commonwealth affairs at the end of this term. The conference will be attended also by the sixth forms of other schools in the neighbourhood and it is hoped that some of these pupils will also be able to join the hundred or so sixth-form boys of Rugby itself for the whole course. We are

particularly glad to have been given this invitation because so much more ground can be covered in a week than in a single day.

Nor are our activities of this kind now entirely confined to sixth forms, important though these are. There are also the secondary modern schools. Here we are about to hold our first experimental conference, but we may find that the most valuable activity for this age group is the project study. In view of the present completely haphazard methods of teaching about the Commonwealth, we feel that it would be useful if, at least once in his school life, the secondary modern pupil made a thorough study of one country, its past, present and future, and saw it as a whole. It is, of course, easier for secondary modern schools to give the necessary time to a project of this kind than the grammar schools, which labour under the constant shadow of public examinations. We have so far been able to organize study projects on this basis in three schools, lasting in each case for a whole term, and the results have been rewarding.

Last, but perhaps not least, in this rather long catalogue of our present activities I must mention our travelling exhibitions, which have been developed as part of the policy of spreading the work of the Institute out of London into 'the field'. Each year we make one photographic exhibition and circulate it, now through the agency of the Central Office of Information. At this moment we have three of these exhibitions on the road, one on Rhodesia and Nyasaland, one on the British Caribbean, and a third called 'Colonial Progress'. A fourth, on Uganda, is in the making. One of them, at Manchester earlier this year, drew some 40,000 people. In most places we supply a lecturer and films with the exhibition, and a number of schools come to see it. Each showing of these exhibitions can, and should, be turned into an educational project in the city or town concerned, and sometimes they are.

As you can see, the Institute is now carrying out a considerable variety of activities. The policy is to use every kind of educational opportunity which offers itself and in particular to try to give the teachers what they want rather than to impose our own methods and ideas. Everything, therefore, which will promote the knowledge of the Commonwealth is grist to our mill. We are, of course, in an experimental stage of our development, and that this experimentation does not lead to a wasteful dissipation of energy has, I hope, been shown only recently when we had the great privilege of inviting your President, H.R.H. The Duke of Edinburgh, to give his unique lesson on the Commonwealth to some 2,000 secondary school children at the Royal Festival Hall. That, as an educational project, was *sui generis*, and I am sure you will agree that its value both to the children and the Commonwealth was outstanding.

What sometimes depresses us a little is not the complexity of our task, but the knowledge that try as we may—and each day only has 24 hours—we can only touch the fringe of it.

And now, what of the future? The Government has decided greatly to expand the Imperial College of Science and Technology and, in order to make this possible, the old, familiar Imperial Institute must, except perhaps for the Queen's

Tower, be pulled down. This is a sad decision but, from the point of view of the Institute, the really important fact is that we are to have a new building. By announcing this decision, the Government has not only kept faith with our Royal founder and with the millions of humble people in the Commonwealth who helped to pay for our foundation, but has shown confidence both in the future of the Commonwealth and in our ability to contribute to it. And this—for us at the Institute—is a new challenge and a new inspiration.

It is quite clear to my Governors that one of the most urgent and important questions is that of our title. The fact that we are still called the Imperial Institute is a handicap to us, both in our approach to the schools and in our co-operation with the other Commonwealth governments on whose support we so greatly depend. Our feelings about the word 'Imperial' may differ, but it is not our feelings that matter—it is those of the teachers and of the newer members of the Commonwealth. The Tweedsmuir Committee suggested 'Commonwealth Institute'. We agree with that recommendation, and we have asked Her Majesty's Government to seek the agreement of the other Governments to its adoption. I had hoped, when I originally received the invitation to give this lecture, to be able to tell you to-day what the new Institute is to be called, where it is to be, and who is to be its architect. Unfortunately I can do none of these things because, since all the Commonwealth Governments must be consulted, it is taking rather a long time to reach the necessary decisions. I am hoping that they will all be taken and announced within the next few months. I can, however, assure you that we are to be given a brand new Institute, built as far as possible according to our needs and wishes on a fine site in inner London, and that there is to be no avoidable delay. I can also assure you that, although part of the old Institute will have to be demolished quite soon in order not to delay the expansion of technological education, arrangements will be made to enable us to carry on all sides of our work with as little interruption as possible until our new building is ready for us. More than this I cannot say, and though I know you are disappointed at my reticence, I am sure you will not press me on these matters.

We at the Institute are looking forward, through and beyond the few disorganized years that lie immediately before us, to a new birth and the challenge of new and expanding opportunities. You will remember Queen Victoria's prayer that the Institute 'may never cease to flourish as a lasting emblem of the unity and loyalty of my Empire'. The Empire has changed into the Commonwealth and, in the words of the present very distinguished Colonial Secretary: 'The Commonwealth is not breaking up, but growing up.' We will do our best to ensure that the new Institute shall play a very active part in that process and that it shall always remain an emblem of the unity and the mutual loyalty of the Commonwealth peoples.

DISCUSSION

THE CHAIRMAN: I am sure we all very much appreciated the interesting and informative talk we have just heard; but despite its comprehensive character—or perhaps because of it—some of you may wish to ask Mr. Bradley questions.

MR. MARTIN A. BUCKMASTER: May I just make a few remarks as an original subscriber, of a very modest sum, to the building of the Imperial Institute? I attended the opening by Edward VII, when I noticed that the architect Colcutt was not mentioned, nor was he decorated for his achievement. I attended the banquet afterwards and I joined the Imperial Institute Club, which then had a very fine billiard room which I enjoyed very much, and of course the other amenities of the club also, which were quite excellent. Now they propose to pull it all down. Also, as an Examiner for the London University, I occupied very comfortable rooms at the Institute to carry out my work. My brother was allotted a laboratory there to carry out his special work in physiology. The whole thing was serving a very useful purpose, and apart from that it was, of course, an examination centre and London University used it a very great deal, and by the slides we have seen it is still serving an extraordinarily useful purpose. A tour through the gallery will teach one more geography in half an hour than you will learn in a classroom for a whole term. Surely these things are important. May I ask everybody here if he would write to his Parliamentary Member and ask him to raise the question in the House of Commons of the preservation of the Imperial Institute. I have already done so, and I have got many others to do so. I think it would help enormously to preserve this very magnificent building.

MR. A. I. WAKEFIELD: I very much enjoyed the lecture and I should like to congratulate Mr. Bradley on his work. I should be grateful if the lecturer could tell me if there are any means, or is consideration being given to any means, for the exchange of teachers and of school children within the Commonwealth. I understand there has been an interchange of teachers with the United States and that that has been tremendously successful.

THE LECTURER: There is a scheme for inter-Commonwealth exchange of teachers already flourishing. It is run by the League of Commonwealth and Empire, and it is on quite a big scale. It manages exchanges of teachers between Canada and this country, between Australia and this country, and between New Zealand and South Africa. We come into this to the extent that when these exchanges happen the teachers have introductory courses and we always make the Institute available for those. There is also another organization which organizes travel by school parties, particularly to Canada I think, though not on a very big scale. There is a good deal of exchange with the continent. Much of our difficulty with the Commonwealth in this respect arises from the great distances involved. It is so expensive to get there. There are quite a few members of my staff here this afternoon. I am quite certain that for their good they ought to be travelling extensively in the Commonwealth, but New Zealand, Australia and Hong Kong are unfortunately not just round the corner.

MR. WAKEFIELD: If they can do it to the United States, surely they can afford to do it in our own Commonwealth.

MR. J. PITCHER: What about the public schools? They used to provide Commissioners for places like the Gold Coast.

THE LECTURER: Public schools do not in fact come into our particular picture very much as yet. The lecturers who visit public schools are sent by the Royal Empire Society, whom we help if necessary; and wherever we have a sixth-form conference (as I told you, we shall have between thirty-five and forty this year) the public schools in the neighbourhood or within reach are always invited and very often come. So our sixth-form conferences do in fact cater for the public schools. The conference at Rugby at the end of this term is of course being organized by us, and it includes the local grammar schools. When it was arranged petrol was rationed, or else I had hoped

they would bring in public schools from further afield. But there is always the question of accommodation to consider as well.

SIR HARRY LINDSAY, K.C.I.E., C.B.E.: Many others before me have congratulated our speaker this evening, but I should like to add my tribute. The paper was interesting, it was informative and what is much more important, it took us behind the scenes when Mr. Bradley showed us his plans for the future.

My own interest in the Imperial Institute goes back many years. When I was a small boy at a preparatory school, geography was taught by means of a primer which gave you the names of the country, its towns, mountains and rivers: you had to learn these by heart, but there was no attempt whatever to interest you in that country. The sort of question that was asked was, 'Name the chief rivers of such and such a country'; or, in converse, 'In what country does such and such a mountain occur?' When I came to the Imperial Institute (my first visit was in 1923 when I was Indian Trade Commissioner in London and was representing India on the Committees and Councils of the Institute) I found geography being taught as it ought to be taught. Geography is not merely the science of the surface of the globe, which is the definition you will find in the dictionary, but also the story of man in relation to his environment. It is his environment which makes man in the first instance and man later makes his environment, shaping it to his own uses. That is why the Institute does such a service to the schools of this country in telling the story of the Commonwealth, which breaks down into the story of each country of the Commonwealth, which breaks down into the story of the development of that country, agriculture, forestry, mining, education, social services, and so on. We could wish that each story were better known in schools throughout this country. Mr. Bradley has shown us that this is what the Institute stands for particularly and what it is doing so successfully.

There is just one question I should like to ask: Is any special effort being made to interest the teachers' training colleges in the work of the Institute? If you can get them on your side you have the schools and you have the children.

THE LECTURER: We regard them as absolutely—if I may coin a phrase—the keyest people in the country. They are the people who matter. Every teacher in a training college can go out and influence a whole school. They are immensely important, and therefore we make very special efforts to provide both one-day conferences and study projects and anything which they can fit into the curriculum in training colleges and which they would like to have. Indeed the prototype of the project study course was in a women's training college in Cheltenham last year, when all the second-year pupils, about forty, took the Caribbean as a subject for research and worked on it the whole term with the aid of our materials. We had conferences at the beginning and end of the course; I believe they used it in their practice teaching, and they really did go away from that course knowing a very great deal about the past, present and the future of the West Indies.

It was on that basis that we have since been organizing our project studies, and I should particularly like to say a word about one that has not yet finished, in a school in Nottinghamshire with a very lively headmistress. It is a secondary modern school, mixed boys and girls in an industrial area. This teacher wanted to do a project study on Malaya last term and she engaged the interest of the whole school in an extraordinary way. The domestic science girls made Malayan dishes and produced a Malayan cookery book; the art classes made models of ox-carts; the geographers made relief maps; the historians drew charts, and so on. At the end of term we were so impressed by this that we asked Mrs. Wilson to come up to London to a conference we had arranged with the Institute of Education called 'The Teaching of the Commonwealth in the Secondary Modern School: a new Challenge'. She came and gave a talk and exhibited the work which her pupils had so far done. It would fill

the whole of the south side of this hall. It was a very remarkable effort. Some teachers present said to her, 'You must have spoilt the rest of the curriculum. You could not have fitted it in. It was not possible. It was not part of your syllabus', and so on, but she dealt with them all very firmly and faithfully, and said her real problem was to get the children to go home in the evening. Now we felt that that was really a most promising experiment; indeed, I have half thought of getting the whole of that project up to London and putting it on as an exhibition of the Institute. I think it would show teachers what can be done. She was a very remarkable woman. I wish there were more like her.

THE CHAIRMAN: I am sure everyone present would like me to thank Mr. Bradley most warmly for his interesting and revealing lecture this afternoon. We have all learnt a great deal about the new educational methods which are being employed. We are very grateful to Mr. Bradley.

A vote of thanks to the Lecturer was carried with acclamation.

SIR SELWYN SELWYN-CLARKE, K.B.E., C.M.G., M.C.: We are indebted to Mrs. Runtz, formerly Lady Holland, who is here this afternoon and who most generously endowed this lecture, for the enjoyment that we have experienced from Mr. Bradley's very interesting talk.

It is my privilege and pleasant duty to ask you to join with me in a vote of thanks to our Chairman. By a curious coincidence, our Chairman was the Governor of Northern Rhodesia, his *last* post in the Colonial Service, a territory in which our lecturer was a District Officer for his *first* post. Another curious coincidence which might interest you is that Sir Gilbert, Mr. Bradley, Mr. Mercer and myself all served in the Gold Coast Colony, or Ghana as it should be called now.

Will you join with me now in thanking Sir Gilbert very warmly for leaving his important duties as High Commissioner and coming here to conduct our proceedings this afternoon?

A vote of thanks to the Chairman was carried with acclamation, and the meeting then ended.

GENERAL NOTES

CRITIC'S CHOICE

The third in the series of exhibitions called 'Critic's Choice' at the Tooth Gallery (which has been in existence for well over a century) is now on view. It is the selection of Mr. Nevile Wallis, who answers the query that has been raised in connection with these shows—should the selector choose works that he would like in his own house, or should he look anywhere for outstanding merit—by adopting the second point of view. He believes in tolerance, irrespective of school. Choice was circumscribed. One of the artists had to be under thirty, one between thirty and forty-five, and one over forty-five. The remainder might be of any age. Total choice was between five and nine.

The oldest selected was an easy choice. He was Sir Matthew Smith, and one of his special qualities seemed to dominate the show. This was sheer nobility, and was apparent in the splendour of the colour in *Blue Vase and Fruit*, and in the immense grandeur of *Provençal Landscape*. Ivon Hitchens is also a great colourist; his *Arabesque of Flowers*, though not nearly so voluptuous as Smith's, is a flamelike conception in orange, pale blue and paler green. Drama, of the most tremendous character was supplied by Edward Burra, who won the Critics' Prize last year, and who uses water-colours as a giant might handle a flagstaff. The overwhelming figures, crowding through the narrow gateway, where Simon of Cyrene carries the gigantic cross for the exhausted Christ, are a muscular race, ruthless and without pity. There is irony

in the thought that the artist has been a semi-invalid all his life. This is the most deliberately figurative work in the exhibition, and is a direct challenge to those who say that the story picture is a thing of the past.

Ruskin Spear can give dignity even to a brick wall on which is inscribed the first syllables of the well-known advertisement, 'My Goodness, My Guinness'. His colossal *Black Rock*, on the south coast, suggests the natural fortifications of a heroic country, and his *Bank Holiday*, 1957, reveals the splendour in the bleak and almost deserted seashore. The younger men are impressive. *The Reclining Nude* of thirty-year-old Anthony Fry is a gesture of statuesque simplicity. There is no hint of drama in Fry's work. This is human dignity, an expression of a sincere mind, carried out with the utmost economy of paint. The other two artists are genuine experimenters. Alan Reynolds, at the age of thirty-one, is represented by flying seed, like cartwheels, trees like naked spears and one dazzling sun sizzling the entire sky. He makes a very individual appeal with his black statements. *Tachistes* have been remembered. Robyn Denny was not one of those who rushed into this exasperating activity. He experimented with consideration, and then unleashed his impressions in a convincing deluge. These paintings are not for everybody. For most people, appreciation may well be a gradual growth. Denny is modest. There is a sense of catastrophic inundations—tidal waves, scattering whole oceans of foam. The building up of the work on a basis of collages seems an occasional intrusion. But anyone who can find a better way to capture the effects required would be eagerly studied by this progressive painter.

The exhibition is an extremely interesting assemblage of paintings brought together by a discerning critic. There is something for everybody, as readers of this *Journal* would naturally expect from Mr. Nevile Wallis.

G. S. SANDILANDS

THE ROYAL PHOTOGRAPHIC SOCIETY'S AUTUMN PICTORIAL EXHIBITION

For this year's exhibition, over 3,000 entries were received and 366 were accepted, representing nineteen countries and territories, apart from the British Isles.

Colour stereoscopy attracts the general public most, and this section is as strong as ever, with five viewing cabinets containing ninety-nine striking examples of this disturbing art—disturbing because we are gazing on 'frozen' life: a 'sleeping beauty', in fact. This is particularly noticeable in No. 359, *Shooting Spray*, by Jack Stolp. An outstanding abstract composition is *Swirl and Zip*, No. 320, by E. E. Krause. There are plenty of very beautiful travel and holiday pictures and a sprinkling of able industrial subjects, natural history, and 'glamour'. Others demand special mention: a frankly theatrical but pleasing *Madonna*, No. 284, by L. B. Dunnigan; *Ten Grand*, No. 358, by J. L. Zakany; and two delightful dachshunds by Mrs. Mae C. Perry: *Hans and Fritz*, No. 340. Those who can stand heights might pause at No. 362, *Over Niagara*, also by Jack Stolp.

Judgment of the other miniature colour transparencies must await the projection sessions. Visitors who wish to view these seventy-eight exquisite productions direct should bring their own magnifying glasses! There are eight larger colour transparencies, including an attractive aerial view of Brightlingsea by F. L. Wills, No. 262. The colour prints are again a select few: thirteen exhibits in all. No. 172, *Thirst*, by Jenifer A. Burgess, is a remarkably successful composition in restful green, grey, and ivory.

If the colour sections gain most of the general public's attention, the monochrome prints still reign supreme in the hearts of the majority of those visitors who are practising photographers. A very mixed bag is presented this year: something for everybody. The traditional rubs shoulders with the *avant-garde* and there are some prints which would surely be happier in the R.P.S. Exhibition of Applied

Photography. Of these, *Soho Trader*, No. 13, by K. C. Soutter; *Football Goal*, No. 78, and *Sport Enthusiasm*, No. 84, both by L. Tibor, are examples. Architecture, landscape, and still-life are all worthily represented, but this section is particularly strong in the number and variety of its portraits. There are a few in the grand and somewhat heavy manner of Vincent M. Hill's *Edwardian*, No. 67, more of the straightforward excellence of Gordon Wilson's *Peter Ustinov*, No. 95, and one or two in the 'modern' style like D. Bevan's *Doreen*, No. 61. The last-named illustrates a trend: the increasing awareness of the edges of the rectangle which, conventionally, confines the picture. It is unfair to dismiss this as 'cropping', for the intention is obviously premeditated and not just a last-minute, desperate onslaught with a print trimmer. Instead of placing the main point of interest on the classical 'intersection of the thirds', more and more pictorialists are consciously 'playing for the touchline'. The most outstanding example is *Young Actress*, No. 97, by Boris Dobro.

The monochrome lantern slides, after a nearly total eclipse last year (three exhibits) show a considerable revival, with twenty-six fine exhibits.

This very attractive exhibition is on view, admission free, at 16 Princes Gate, S.W. 7 (200 yards east of Exhibition Road, facing Hyde Park) until 26th October: Mondays to Fridays from 10 a.m. to 7 p.m., Saturdays from 10 a.m. until 5 p.m. From 23rd November to 14th December, it can be seen in the City Art Gallery, Worcester.

F. L. PAIGE

THE BRITISH COMPUTER SOCIETY

The British Computer Society announce that Dr. M. V. Wilkes, F.R.S., has accepted their invitation to become the first President of the Society. Dr. Wilkes, who is a Director of the Cambridge University Mathematical Laboratory and a Fellow of St. John's College, was a pioneer in the design and construction of automatic electronic digital calculating machines in this country.

Membership of the British Computer Society is open, on payment of an annual subscription, to anyone who has an interest in the use of electronic computers and computing techniques. The Society's winter activities begin on 21st October, and the regular monthly meetings which follow will cover a wide variety of subjects. Details of these and of membership may be obtained from the Secretary at 29 Bury Street, London, S.W.1.

It is also announced that a north-western branch of the Society has been formed in Manchester, and will hold its first public meeting at the College of Science and Technology there at 7 p.m. on 14th October. The Principal of the College, Dr. B. V. Bowden, will preside and address the meeting. Interested persons are welcome to attend. Those unable to do so on this occasion, but who wish to take part in the activities of the branch, are asked to write to the Secretary, North-Western Branch, The British Computer Society, College of Science and Technology, Manchester 1.

EXTENSION OF THE COUNCIL OF INDUSTRIAL DESIGN'S RESPONSIBILITY FOR STREET FURNITURE

The Minister of Transport has invited the Council of Industrial Design to add to their list of approved street furniture designs several new categories, including passenger bus shelters, bollards, guard rails, bins for litter and grit, and other roadside equipment. The Minister intends that new street furniture on trunk roads shall comply with these approved designs as soon as this becomes practicable. Manufacturers who wish to be represented on this new list—and architects, designers and authorities who have produced designs which could be made available to manufacturers—are invited to submit details to: Mr. Peter Whitworth, Secretary to the Street Furniture Panel, Council of Industrial Design, 28 Haymarket, London, S.W.1. A list of items in the categories described above will in due course be published.

OBITUARY

HIS MAJESTY THE KING OF NORWAY

H.M. King Haakon VII, who died on 21st September at the age of 85, was the first sovereign of an independent Norway for over 500 years, and a great and wise leader of that country in peace and war. During a long reign his hold on the respect and affection of his subjects steadily increased; his years of enforced absence, from 1940–45, during which he personified the Norwegian will to resist the invader, only served to confirm a mutual devotion. His attachment to England, strengthened by ties of marriage and friendship, lasted all his life.

King Haakon was born Christian Fredrik Carl George Waldemar, the second son of the Crown Prince of Denmark, on 3rd August, 1872. As a youth he served in the Danish Navy, and always had a particular love of the sea, and pride in the developing maritime influence of Norway. In 1896 he married his cousin Princess Maud, daughter of King Edward VII, and for some years had a house near Sandringham. In 1905 the Norwegian Storting dissolved the Union with Sweden, and later in the year offered the throne to Prince Carl. He accepted it on condition that he should be elected by a free vote of the people. This provision was amply fulfilled in the result of a plebiscite. Choosing the historic name Haakon, swearing allegiance to the Norwegian constitution, and adopting 'All for Norway' as his motto, he came as the people's King and very soon showed how closely he identified himself with their interests and with the Norwegian tradition of democratic government.

The neutrality and independence which Norway maintained under his guidance in the 1914–18 war he again affirmed in 1939–40. When the country was invaded in 1940, however, the King refused to compromise with the Germans, and until the position became hopeless, his presence inspired his country's struggle. Forced to take refuge in England, for five years he was tireless in his efforts to organize the Norwegian war effort, and to comfort and encourage his people. When Norway was delivered and he returned, in June, 1945, he was greeted with immense enthusiasm. The problems of peace were faced at once, and without inner conflict.

A visitor to this country on several occasions since the war, King Haakon always showed a wide interest in English affairs, and in 1905 he was graciously pleased to accept an invitation from the Prince of Wales (then President) to become an Honorary Royal Member of the Society.

CORRESPONDENCE

PAINTING WITH POLYVINYL CHLORIDE PASTES

From *GEORGE R. COOPER, D.Sc., Ph.D., B.Sc., THE GABLES, HERTINGFORDBURY ROAD, HERTFORD*

Regarding Correspondence in the issue for 30th August, concerning 'Painting with Polyvinyl Chloride Pastes': whilst I have not actually painted with these materials, I have in the course of a number of years painted with the conventional oil paints on a variety of different supports. The picture which was most successful was painted on a sheet of bakelite, the glazed surface having first been removed by rubbing with fine sandpaper in order to form a tooth to hold the paint. A small percentage of varnish was incorporated with the paint as an additional binder and this picture, which was painted some five years ago, has shown no signs of flaking or coming away from the backing.

More recently I have obtained specimens of fibre-glass material with which it is proposed to carry out further experiments, and I would certainly be most interested in combining tests on this material using polyvinyl chloride pastes as the pigment.

Dr. Jordan's suggestion for using anodized aluminium panels as painting supports is extremely interesting, and I would certainly be perfectly willing to carry out a series of tests with this material should specimens be available.

NOTES ON BOOKS

PAUL MANSHIP. *By Edwin Murtha. New York, The Macmillan Co., n.d., 87s 6d.*

In 1912, at the age of 27, Paul Manship returned to New York after three years at the American Academy in Rome and exhibited several works. They were at once recognized as containing qualities of design and construction of a higher order than the naturalistic sculpture prevalent in America at that time. His reputation grew rapidly and he was soon receiving commissions of increasing importance. His industry was prodigious and still is, forty-five years later.

This volume catalogues nearly six hundred works and illustrates excellently over two hundred of them, ranging from small statuettes to the great bronze Rainey Memorial Gateway (1934, Pl. 58), 36 feet high by 42 feet wide, on which Manship spent several years. He is shown to be as much at home with animal as with human form; with allegory as with portraiture. He works in relief and in the round, in bronze, stone and marble, proving himself to be a master-craftsman, a prolific designer, a taker of infinite pains.

Perhaps his best known work in Europe is the Woodrow Wilson Memorial at Geneva (1939), which is reproduced here in colour as a frontispiece. It is a great celestial globe in pierced bronze partially gilt, displaying the major constellations each against the modelled background of its mythological figure accurately placed on the curve of the heavens: an amazing piece of ingenuity, craftsmanship and erudition.

But unhappily it is these last three elements which force themselves upon the notice of the critic as he turns and re-turns the magnificent pages of this book. With few exceptions, such as the delightful Putto from the *Cycle of Life* (1920-27, Pl. 34), possibly his most satisfying sculpture, the impressive sketch of *Peace* (1941, Pl. 99) or his naïve *Hairdo* (1952, Pl. 112), Manship's works do not sufficiently conceal, as do true masterpieces of art, the effort put into them. His figures seem aware of their audience and their movement is restless rather than arrested. Where he works in the style of a past age he appears imitative more than derivative—although both the Foreword by the Director of the National Gallery of Art, Washington and Manship's biographer claim the contrary and the latter cites that learned critic, the late Stanley Casson, as supporting this view in *XXth Century Sculptors*. But with the passage of time there can be little doubt that whereas, for example, Milles' mighty *Sun Singer* on the water-front at Stockholm is and will continue to be regarded as a new conception derived from the archaic Greek, Manship's *Spear Thrower* (1921, Pl. 19) is little more than an able imitation and would remain so even if enlarged to the same heroic scale.

Although by virtue of his many and admittedly fine qualities he ranks high among the sculptors of the first half of the century, Manship cannot compete as an artist, wherever he is comparable, with Epstein, Mestrovic, Milles or Moore. His works are able, rather than profound. But on the credit side he almost entirely avoids the bathos which has been so prevalent a weakness in American sculpture. His technical skill is on a par with the best in any age of the art, and well merits the close attention of young sculptors who to-day too often lack the practical ability to express themselves; but he fails to convey intensity of feeling.

It is a keen disappointment for your reviewer to find that, judging from this collection of excellent photographs well reproduced, presented and documented, the art of Paul Manship as a whole does not measure up to his great reputation. There can however be nothing but praise and admiration for the industry and virtuosity of this very able sculptor.

The publishers are to be congratulated upon their choice of author and John Manship has designed for them a handsome book, well printed and bound by

Wagner'sche Univ.-Buchdruckerei, Innsbruck, Austria. It is to be hoped they will add an *Ivan Mestrovic* and a *Carl Milles* to make a series; both of these great sculptors having made their homes in the United States, the latter from 1930 until shortly before his death in 1955, and the former since the last War.

C. d'O. PILKINGTON JACKSON

LALIT KALĀ: A JOURNAL OF ORIENTAL ART CHIEFLY INDIAN, Nos. 1–2. *Lalit Kalā Akadami, New Delhi, April* 1955–*March* 1956. Foreign subscription rate: Rs. 20 p.a.

For those of us who live in a country that has almost come to take its cultural institutions for granted it is a great pleasure to watch the progress of the Indian National Academy of Art since its inauguration in 1954. The Lalit Kalā Akadami has already sponsored exhibitions and publications designed to encourage present-day art and foster public consciousness of a magnificent cultural heritage. In the field of scholarship the need for a first-rate journal of international status devoted to Indian art and archaeology has been recognized by the Akadami, and in the journal *Lalit Kalā* it intends to meet this need. A forthright editorial in the first issue of the journal has outlined its very earnest and ambitious aims, and it is to be hoped that these will be maintained.

The first double number of the journal, which in future will be published biennially, contains editorial notes consisting of six fruitful articles by Karl Khandalavala and Dr. Moti Chandra, twenty-one other contributions by Indian scholars and four reviews. The contributions vary a great deal in length and importance, and the ground covered ranges from a summary of the excavations at Rupar to an appreciation of Nandalal Bose, the venerable disciple of Abanindranath Tagore. Contributions are profusely illustrated with almost two hundred half-tone illustrations on sixty-eight pages of plates, with the addition of thirteen excellent colour plates and some line drawings in the text. With this wealth of illustrations it is not surprising that the main emphasis has been placed on introducing hitherto unpublished examples from Indian sites and museums; but there are also contributions which show that the journal will be a fruitful source of stimulating and original ideas.

While the matter contained in the first issue is generally of a high standard, there are, unfortunately, signs that the presentation of material lacks in places the precision that is so vital in a publication intended to serve the requirements of serious scholarship. This is a danger that must be avoided if the journal is to take its place in the first rank of international periodicals devoted to oriental art. Oddly enough, the standards set by the editors in this respect are not always as high as those appearing in other contributions. Lapses are particularly noticeable, for example in the third and fifth articles in the editorial notes. The type of defect which mars certain contributions can be observed in an examination of the way in which references to publications are given, and also of the methods of transliteration used for oriental words. It would be unkindness on the part of the reviewer to reproduce the first of the bibliographical references in the fifth editorial article (p. 37), where five errors appear in the eight words of the book title quoted, especially since carelessness of this kind is less exasperating than insufficiency of bibliographical detail, a fault which occurs more frequently in this journal. On the whole, titles are correctly given, with date and place of publication and specific page references, but the proportion of inadequate references is unduly high. With regard to the transliteration of oriental words, it is noticed that words of Sanskrit origin are mostly provided with adequate diacritical markings but Arabic and Persian words are not. Inattention to this point can lead to blunders which invalidate the arguments put forward. This is shown in the third editorial article (p. 31) where we read: 'The worn out inscription on the Boston Museum Miniature (Pl. III, Fig. 3) has the name obliterated and only the letter "a" could be read by Coomaraswamy, who thought that it must be the "a" of

"Amber". But it could just as well be the "a" of "Abhang Khan" because the words before "a" cannot be made out.' The writer of the article has not noticed that the letter transliterated by Coomaraswamy is *'ain* whereas the name Abhang commences with the letter *alif*. Insistence on the correct rendering of such details may seem pedantic but it is the backbone of sound scholarship.

ROBERT SKELTON

MAN AND AUTOMATION. *By L. Landon Goodman. Harmondsworth, Penguin Books, 1957. 3s 6d*

Whether this intriguing little volume is a technically accurate account of automation the reviewer is not competent to say, but presumably the author's name is sufficient warrant of that. Mr. Goodman has adequate academic qualifications, he has spent most of his working life in connection with the improvement of industrial productivity, and he has contributed to many technical journals. The general reader, therefore, may place some confidence in his description of mechanical handling methods and processing, of sensing and control, of servo-mechanisms and electronic computing. Mr. Goodman evidently has that clarity of comprehension which permits simplification without misrepresentation, and he provides for the layman an admirably clear general picture of the techniques of automation. Intelligently conceived line diagrams illuminate some of the more complex assemblages of facts, and several attractive plates illustrate the range of activities which automation includes.

Many readers, however, will be less concerned to secure a knowledge of automation techniques than to gain some understanding of the social and human implications of this second industrial revolution, and Mr. Goodman is an intelligent guide in this wider field. Popular newspaper stories have made the man in the street familiar with the dramatic feats of the automatic computer, solving in a few minutes problems which would occupy some scores of mathematicians for some weeks, and in a general way John Citizen is aware of the tremendous advance in automatic assembly line processes in industry; but few have yet appreciated the wide-ranging potentialities of automation in many aspects of daily life. Take, for example, the fact that an immense amount of clerical work is of a routine nature admirably suited for machines: yet, how many snug clerks are aware that automation may produce more redundancy in office than in workshop? And, when in this way we manage to reduce the remarkably high proportion of our labour force at present occupied in keeping records of one sort or another, and instead deploy it in productive labour, what immense increment of social wealth may we not expect?

Questions such as these Mr. Goodman considers carefully, and he also discusses the ways in which both trade unions and employers will need to modify their attitudes if the ultimate great benefits of automation are to be obtained without immediate great hardship. Men and women are not just 'labour units' to be moved as economic interest may demand: they are sentient creatures, the people for whom economies exist, and their very real fears of redundancy and enforced mobility will need careful and sympathetic handling. But—and this is perhaps the most cheering implication of automation—as the routine jobs are taken over by machines, the work remaining for humans will increasingly be interesting and intelligence-demanding.

There lies ahead of us the possibility of a society with great material comforts and long hours of leisure, yet without the soul-destroying repetitive work ironized by Charlie Chaplin in his great film *Modern Times*. No longer will it be possible to distinguish the factory worker from the office worker by his greasy overalls, and what will then become of innumerable social conventions and convictions of superiority? Or, for that matter, what will people do with their increased leisure and higher earnings? And will we use this great new power as a means of building a really brave new world, or as a means of killing each other more efficiently? Well may Mr. Goodman end his book with the question, *quo vadis?*

CYRIL BIBBY

SHORT NOTES ON OTHER BOOKS

ELECTRIC POWER. *By F. J. M. Laver. London, O.U.P. (Oxford Visual Series), 1957. 7s 6d net.*

A brief and simple introduction to the electrical and magnetic effects that are of principal importance to those beginning the study of technical electricity. The admirably clear exposition, which is reinforced by plentiful diagrams and a number of plates, assumes only an intelligent interest on the reader's part, and not a prior knowledge of the processes described.

JAPANESE WOODCUTS. *By Basil Gray. Oxford, Bruno Cassirer, n.d. 8s 6d net.*

This attractive book contains twenty beautifully produced plates (printed in Holland) illustrating examples of the earliest hand-coloured prints as well as works by the great masters of later times. Mr. Basil Gray's text, which includes an introduction and notes on each plate and each artist represented, was first published in the catalogue of the Exhibition of Japanese Prints organized by the Arts Council in London in 1948.

BRISTOL AS IT WAS, 1939–1914. *By Reece Winstone. Bristol, Reece Winstone, 1957. 8s 6d net.*

Mr. Winstone has drawn on his collection to provide a retrospective photographic record of the buildings, sights and life of Bristol during the period between the outbreak of the First World War and the devastating air raids of 1940. It will have a vivid appeal to those who wish to revive memories of what they can no longer see; and the historian will value the photographs all the more for their precise dating. Bibliography. Map. Two indexes.

FROM THE JOURNAL OF 1857

VOLUME V. *25th September*, 1857

PHOTOGRAPHING ON WOOD

Extracted from the Scientific American:

In preparing wood engravings—such as are employed . . . where the pictures are printed on the same sheet and at the same time with the types or letter-press—the picture is first drawn by hand on the smooth block of wood, and the lines and shades are subsequently raised, or rather the white surface is *sunk* by the skill of the engraver. A patent was issued on the 5th of May last, to R. Price, of Worcester, Mass., for a process of photographing on wood in lieu of drawing by hand, which has since been so far developed by the proprietors, C. J. B. Waters and Co., of No. 90 Fulton Street, this city, as to be pronounced successful by some of our best engravers. The surface is so prepared as to be sensitive to light like the glass or paper employed in the ordinary photographic processes, and the image of any object is thus impressed upon the block with greater accuracy than it is possible to accomplish by human skill. We have seen some wood blocks bearing very fine pictures produced by this means, and a number of such pictures have been engraved and printed, showing that it is practicable so to use them. The principal defect of such 'sun pictures' for this purpose is their too great delicacy and faintness. If this can be overcome, and the pictures be produced with the vigour and strength of ordinary Indian ink work, the invention will very greatly facilitate the production of illustrated books and newspapers . . . At present, the invention is most successful in reducing engravings from copies. It is now in daily use for this purpose.